

CLAIMS

1. A peptide sequence enabling mycobacteria to adhere to host cells, in particular epithelial cells.
2. A peptide sequence according to claim 1, characterized in that said
5 sequence comprises a mycobacterial heparin-binding haemagglutinin (HBHA) type antigen, in particular an antigen obtained from *M. bovis* BCG or *M. tuberculosis*.
3. A peptide sequence according to claim 1 or claim 2, characterized in that
10 said sequence comprises the peptide sequence of in Figure 10, or any variant of that sequence which enables mycobacteria to adhere to host cells and obtained by addition, substitution or deletion of one or more amino acids of said sequence.
4. A peptide sequence according to claim 3, characterized in that it comprises
15 the C-terminal portion of the peptide sequence of Figure 10, more particularly the sequence comprising the last 50 amino acids of the peptide sequence of Figure 10 or any variant of that sequence enabling mycobacteria to adhere to host cells and obtained by addition, substitution or deletion of one or more amino acids of said sequence.
5. A peptide sequence according to any one of claims 1 to 4, characterized in
20 that it comprises the following peptide sequence:
KKAAPAKKAAPAKKAAPAKKAAAKKAPAKKAAAKKVTQK
or any portion or variant of that sequence enabling mycobacteria to adhere to host cells and obtained by addition, substitution or deletion of one or more amino acids of said peptide sequence.
- 25 6. A peptide sequence according to any one of claims 1 to 5, characterized in that it is recognised by the monoclonal antibody 4057D2.
7. A recombinant peptide sequence, characterized in that it enables mycobacteria to adhere to host cells, in particular epithelial cells.
8. A recombinant peptide sequence according to claim 7, characterized in that

said sequence is the expression product of a nucleotide sequence coding for a peptide sequence enabling mycobacteria to adhere to host cells, more particularly a peptide sequence obtained from *M. bovis* BCG or *M. tuberculosis*.

- 5 9. A recombinant peptide sequence according to claim 8, characterized in that said sequence is the expression product of a strain of *E. coli* transformed with a nucleotide sequence coding for a peptide sequence enabling mycobacteria to adhere to host cells, more particular a nucleotide sequence obtained from *M. bovis* BCG or *M. tuberculosis*.
- 10 10. A recombinant peptide sequence according to claim 8, characterized in that it comprises a recombinant polypeptide of about 25 kDa recognised by the monoclonal antibody 3921E4 and not recognised by the monoclonal antibody 4057D2.
11. A recombinant peptide sequence according to any one of claims 7 to 10, characterized in that it comprises the expression product of a nucleotide sequence coding for the peptide sequence of Figure 10 or for any portion of said peptide sequence enabling mycobacteria to adhere to host cells.
- 15 12. A recombinant peptide sequence according to any one of claims 7 to 10, characterized in that it is the expression product of the nucleotide sequence coding for the C-terminal portion, more particularly the sequence comprising the last 50 amino acids of the peptide sequence of Figure 10 or for any portion of said peptide sequence enabling mycobacteria to adhere to host cells.
- 20 13. Use of a peptide sequence according to any one of claims 1 to 12, to prepare vaccines against mycobacterial infections, particularly infections caused by *M. bovis* or *M. tuberculosis*.
- 25 14. Use of HBHA or a derivative polypeptide, preferably modified according to any one of claims 1 to 12, for diagnosis of a mycobacterial infection.
15. Use according to claim 14, characterized in that said protein or said

polypeptide is used to detect anti-HBHA antibody in a biological fluid.

16. An immunogenic composition, characterized in that it comprises a peptide sequence according to any one of claims 1 to 12.
- 5 17. Use of sulphated glucides or sulphated glycoconjugates to inhibit the adhesion of mycobacteria to epithelial cells.
18. Use according to claim 17, characterized in that the sulphated glucide is selected from the group formed by heparin, chondroitin sulphate and dextran sulphate as well as their natural or synthetic derivatives.
- 10 19. A nucleotide sequence characterized in that it codes for a peptide sequence enabling mycobacteria to adhere to host cells, in particular to epithelial cells.
20. A nucleotide sequence according to claim 19, characterized in that said sequence codes for a mycobacterial heparin-binding haemagglutinin type (HBHA) antigen.
- 15 21. A nucleotide sequence according to claim 19 or claim 20, characterized in that said sequence codes for a peptide sequence comprising the peptide sequence of Figure 10 or any portion of said peptide sequence enabling mycobacteria to adhere to host cells and obtained by addition, substitution or deletion of one or more amino acids of said peptide sequence.
- 20 22. A nucleotide sequence according to claim 21, characterized in that said sequence codes for a peptide sequence corresponding to the C-terminal portion, more particularly the sequence comprising the last 50 amino acids of the peptide sequence of Figure 10 or any variant of said sequence enabling mycobacteria to adhere to host cells and obtained by addition, substitution or deletion of one or more amino acids of said peptide sequence.
- 25 23. A nucleotide sequence according to any one of claims 19 to 22, characterized in that said sequence comprises a sequence which codes for the following peptide sequence:

KKAAPAKKAAPAKKAAPAKKAAAKKAPAKKAAAKKVTQK

or any variant of that peptide sequence enabling mycobacteria to adhere to host cells and obtained by addition, substitution or deletion of one or more amino acids of said peptide sequence.

- 5 24. A recombinant vector, characterized in that it comprises a nucleotide sequence according to any one of claims 19 to 23.
25. A recombinant host cell, characterized in that it comprises a nucleotide according to any one of claims 19 to 23 in its genome.
26. A recombinant host cell according to claim 25, characterized in that said
10 host is a mycobacterium, in particular BCG.
27. A host according to claim 25 or claim 26, characterized in that said nucleotide sequence is overexpressed by said host.
28. Use of a recombinant host cell according to any one of claims 25 to 27, for anti-cancer therapy.
- 15 29. A kit for detecting the presence of anti-HBHA antibodies in a sample of a biological fluid, said kit comprised HBHA or a polypeptide, preferably modified, according to any one of claims 1 to 12, or one or more immunogenic regions of said protein adsorbed on a support and optionally, a labelled antibody (and if necessary a non labelled antibody) as well as
20 the usual buffers and a label substrate.

add A, 7

add B, 7

add F, 15